

# **Evaluation of Expected Effectivity of Antimisting Fuel in Postcrash Fire Accidents, 1964-1983**

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16. Abstract  The National Transportation Safety Board (NTSB) data on 627 accidents, involving U.S. turbine-powered aircraft from 1964 through 1983 was reviewed to determine the potential effectiveness of antimisting kerosene (AMK) fuel in minimizing fire fatalities and damage.  Postcrash fires occurred in 91 accidents and sufficient data were available for 70 of these postcrash fire accidents to characterize the potential effectiveness of AMK protection. Forty-three of the 70 accidents were considered to be impact-survivable. AMK protection could have been expected in 34 of these 43 impact-survivable accidents. The analysis also shows 346 of 348 known deaths due to fire in the 43 accidents could have been saved if AMK had been the fuel. If the 156 deaths due to unknown causes are apportioned in the same ratio as the known cases, and additional 66 lives could have been saved.			
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## INTRODUCTION

### PURPOSE.

The purpose of this analysis is to determine the potential effectiveness of antimisting kerosene (AMK) fuel in minimizing fire fatalities and damage based on past postcrash fire accidents.

When the AMK program was conceived in 1978, the goal was to save the lives that were lost to fire in impact-survivable accidents. Historically, 30 to 40 percent of the deaths in such accidents have been attributed to fire.

### APPROACH.

The National Transportation Safety Board (NTSB) computerized file of aircraft accidents and incidents which occurred between 1964 and 1981, inclusive, was used to extract data on all turbine-powered, domestic, air carrier accidents. Data on accidents that occurred in 1982 and 1983 were obtained from hard copy NTSB accident reports.

### ACCIDENT ANALYSIS.

The records of 627 accidents that took place in the United States and its territories were reviewed and analyzed. The 627 accidents were narrowed to the 91 used in this study based on the following criteria: (1) fire after impact, (2) destruction or substantial damage to the aircraft, and, where known, (3) impact velocities within the range of 100 to 160 knots (the upper limit for most impact-survivable accidents).

Sufficient data for analysis were available in 70 of the 91 accidents (the 21 accidents lacking documentation are listed in table 1 in chronological order).

The 70 accidents having adequate documentation were examined in detail to determine whether AMK could have prevented fire deaths and injuries. The criteria used represented the conditions most likely to occur in impact-survivable accidents.

1. Impact with fuel release below 155 knots, and
2. Fuel release location not in the proximity of a major ignition source.

These were the criteria for which AMK had been developed. AMK was designed to form a coarse mist when released from a ruptured fuel tank. This coarse mist inhibits propagation of flame when a portion of the mist is exposed to an ignition source. With the fuel release location at the ignition source, there is not enough time for the requisite coarse mist to fully develop before being exposed to the ignition source, and a fire can develop which may become attached to the aircraft.

The 70 accidents are listed and classified in tables 2, 3, and 4. Appendix A and B contain brief descriptions of the accidents, rationale for classification, and cross references on the accidents.

Forty-three of the 70 accidents were considered to be impact-survivable. AMK protection could have been expected in 34 of these 43 impact-survivable accidents. In the remaining 9 accidents, limited or no AMK protection could have been expected because either the fire did not originate as a fuel fire, the fuel release and ignition source were not separated, or the fuel ignited after the aircraft came to rest.

There were 978 deaths in the 43 impact-survivable accidents: 472 due to impact, 348 due to fire, and 158 due to unknown causes (see table 5). The analysis shows 346 of the 348 documented fire deaths could have been saved if AMK had been the fuel. This represents 99.4 percent of the deaths that occurred due to fire and 35.4 percent of the total deaths.

If the 156 deaths (see tables 2 and 5) due to unknown causes are apportioned in the same ratio as the known cases, an additional 66 lives could have been saved. Therefore, the use of AMK could have saved as many as 412 lives or 42 percent of the total fatalities. This is well above the original design goals set for AMK fuel.

Extending this same analysis to the serious injuries, AMK could have prevented 73 serious fire injuries. Apportioning the unknown causes in the same ratio as the known causes, indicated that the use of AMK could have prevented an additional 71 serious fire injuries.

TABLE 1. ACCIDENTS WITH POSTCRASH FIRES - AMK PROTECTION  
UNKNOWN — INSUFFICIENT DATA (1964 - 1983)

NO.	DATE	LOCATION	AIRCRAFT	OCCUPANTS	FATAL INJURIES			SERIOUS INJURIES		
					IMPACT	FIRE	UNKNOWN	IMPACT	FIRE	UNKNOWN
1	7-1-64	JAMAICA, NY	B720	12						
2	8-26-64	KANSAS CITY, MO	B707	138						
3	9-13-65	KANSAS CITY, MO	CV880	4						
4	3-21-66	NORFOLK, VA	CL440	6						
5	1-23-67	SAN JUAN, PR	CV640	28						
6	3-10-67	KLAMATH FALL, OR	F27	4			4			
7	6-26-67	GRAND RAPIDS, MI	V745	33						1
8	11-28-67	RALEIGH, NC	V745	43						1
9	4-28-68	ATLANTIC CTY, NJ	DC8	4						2
10	6-24-68	SIOUX FALLS, SD	CV580	22			5			
11	2-11-70	STOCKTON, CA	B707	6						1
12	8-24-70	HILL AFB, UT	L188	3						
13	9-29-70	DALLAS, TX	B720	54						
14	10-10-70	WRIGHTSTOWN, NJ	L382	3			3			
15	10-28-73	GREENBORO, NC	B737	96						
16	4-30-75	DEADHORSE, AK	L188	3						
17	8-25-75	JAMAICA, NY	DC10	231						3
18	1-13-77	ANCHORAGE, AK	DC8	5						
19	1-5-79	UMIAT, AK	L188	15						1
20	2-9-79	MIAMI, FL	DC9	5						
21	2-24-79	MEMPHIS, TN	BEECH	1						
TOTAL				716	0	0	12	0	0	9



TABLE 2. ACCIDENTS WITH POST-CRASH FIRES - AMK PROTECTION EXPECTED (1964 - 1983)

NO	DATE	LOCATION	AIRCRAFT	OCCUPANTS	FATAL INJURIES			SERIOUS INJURIES		
					IMPACT	FIRE	UNKNOWN	IMPACT	FIRE	UNKNOWN
1	11-8-65	CONSTANCE, KY	B727	62	4		54			4
2	11-11-65	SALT LAKE CITY	B727	91		43				35
3	4-22-66	ARDMORE, OK	L188	98	83					15
4	11-6-67	ERLANGER, KY	B707	36	1					
5	11-20-67	CONSTANCE, KY	CV880	82			70			12
6	3-21-68	CHICAGO, IL	B727	3				1		
7	10-25-68	HANOVER, NH	FH227	42	32			10		
8	12-24-68	BRADFORD, PA	CV580	47	20					27
9	12-27-68	CHICAGO, IL	CV580	45	27			16		
10	1-6-69	BRADFORD, PA	CV440*	28			11	17		
11	6-24-69	MOSES LAKE, WA	CV880	5	1	2			2	
12	10-16-69	STOCKTON, CA	DC8	5						
13	11-27-70	ANCHORAGE, AK	DC8	229	1	46			49	
14	6-7-71	NEW HAVEN, CT	CV580	31	1	27			3	
15	5-18-72	FT. LAUDERDALE	DC9	10				3		
16	5-30-72	FT. WORTH, TX	DC9	4	3	1				
17	8-13-72	JAMAICA, NY	B707	186						
18	12-8-72	CHICAGO, IL	B737	61	18	25		12		
19	12-20-72	CHICAGO, IL	DC9	45		10				15
20	12-29-72	MIAMI, FL	L1011	163	99			46	14	
21	6-23-73	JAMAICA, NY	DC8	128				8		
22	11-27-73	CHATANOOGA, TN	DC9	79				5		
23	12-17-73	BOSTON, MA	DC10	167						16
24	1-30-74	PAGOPAGO, SAMOA	B707	101	1	95			5	
25	9-11-74	CHARLOTTE, NC	DC9	82	32	33	6			10
26	6-24-75	JAMAICA, NY	B727	124	87	25				12
27	8-30-75	GAMBELL, AK	F27	32	10			20		
28	9-27-75	MIAMI, FL	CL44	10			6			4
29	4-5-76	KETCHIKAN, AK	B727	50	1					32
30	4-27-76	ST. THOMAS, VI	B727	88	18	19		19		
31	11-16-76	DENVER, CO	DC9	86				2		
32	4-4-77	NEW HOPE, GA	DC9	85	33	20	9			22
33	11-21-80	YAP, W. CARO. IS.	B727	73						3
34	2-17-81	SANTA ANA, CA	B737	110				4		
TOTAL				2488	472	346	156	163	73	207

\*PROP JET CONVAIR 440

TABLE 3. ACCIDENTS WITH POSTCRASH FIRES - NON-SURVIVABLE (1964 - 1983)

NO	DATE	LOCATION	AIRCRAFT	OCCUPANTS	FATAL INJURIES		SERIOUS INJURIES	
					IMPACT	FIRE	IMPACT	FIRE
1	5-7-64	SAN RAMON, CA	F27	44	44			
2	11-15-64	LAS VEGAS, NV	F27	29	29			
3	8-16-65	CHICAGO, IL	B727	30	30			
4	10-1-66	WEMME, OR	DC9	18	18			
5	3-9-67	URBANA, OH	DC9	25	25			
6	3-30-67	KENNER, LA	DC8	6	6			
7	7-19-67	HENDERSONVILLE	B727	79	79			
8	8-10-68	CHARLESTON, WV	FH227	37	35		2	
9	12-26-68	ANCHORAGE, AK	B707	3				
10	7-26-69	POMONA, NJ	B707	5				
11	11-19-69	GLENS FALLS, NY	FH227	14	14			
12	9-8-70	JAMAICA, NY	DC8	11	11			
13	11-14-70	HUNTINGTON, WV	DC9	75			75	
14	3-31-71	ONTARIO, CA	B720	5	5			
15	6-6-71	DUARTE, CA	DC9	49	49			
16	9-4-71	JUNEAU, AK	B727	111	111			
17	6-29-72	APPLETON, WI	CV580	5	5			
18	6-29-72	APPLETON, WI	DHC6	8	8			
19	7-23-73	ST. LOUIS, MO	FH227	44	38			
20	7-31-73	BOSTON, MA	DC9	89	3		85	
21	9-8-73	KING COVE, AK	DC8	3	6			6
22	9-27-73	MENA, AR	CV600	11	11			1
23	11-3-73	BOSTON, MA	B707	3			3	
24	5-23-74	SPRINGFIELD, IL	L382	4	4			
25	12-1-74	BERRYVILLE, VA	B727	92	92			
26	9-25-78	SAN DIEGO, CA	B727	135	135			
27	5-25-79	CHICAGO, IL	DC10	271			271	
TOTAL				1206	758	0	442	2
								0
								7

TABLE 4. ACCIDENTS WITH POSTCRASH FIRES - AMK PROTECTION NOT EXPECTED  
AND IMPACT-SURVIVABLE (1964 - 1983)

NO	DATE	LOCATION	AIRCRAFT	OCCUPANTS	FATAL INJURIES			SERIOUS INJURIES		
					IMPACT	FIRE	UNKNOWN	IMPACT	FIRE	UNKNOWN
1	6-9-65	SAN FRANCISCO	DC8	77						
2	10-14-65	WPAFB, OH	AW650	3						
3	12-28-70	ST. THOMAS, VI	B727	55			2	11		
4	3-5-73	DENVER, CO	B707	3						
5	1-16-74	LOS ANGELES, CA	B707	65						
6	2-7-74	LOS ANGELES, CA	DC8	161						1
7	11-12-75	JAMAICA, NY	DC10	139						
8	3-1-78	LOS ANGELES, CA	DC10	200		2				31
9	12-29-80	PHOENIX, AZ	DC8	247						2
	TOTAL			950	0	2	2	11	0	34

TABLE 5. SUMMARY OF POSTCRASH FIRE INJURIES

Number of Accidents with Sufficient Data Available for Analysis----	<u>Impact</u>	<u>Fire</u>	<u>Unknown</u>	<u>Impact</u>	<u>Fire</u>	<u>Unknown</u>
Impact Non-survivable----	1230	348	600	176	73	248
Impact-Survivable----	758	0	442	2	0	7
Impact-Survivable and AMK Protection Expected----	472	348	158	174	73	241
	472	346	156	163	73	207

APPENDIX A

ACCIDENT BRIEFS AND CLASSIFICATION

DATE: 64/5/7  
LOCATION: Near San Ramon, California  
OPERATOR: Pacific Airlines  
AIRCRAFT: Fairchild F-27  
AMK PROTECTION: No  
BRIEF: Passenger shot pilot and copilot in act of self-destruction.  
Aircraft in uncontrolled descent impacted ground in excess of 250 knots. No AMK protection expected due to high impact velocity and the impact being nonsurvivable.

DATE: 64/11/15  
LOCATION: Las Vegas, Nevada  
OPERATOR: Bonanza Airlines  
AIRCRAFT: Fairchild F-27  
AMK PROTECTION: No  
BRIEF: Accident occurred during a VOR/DME-3 approach when aircraft struck mountainside during snowstorm. No AMK protection expected due to the impact being nonsurvivable.

DATE: 65/6/9  
LOCATION: San Francisco, California  
OPERATOR: National Airlines  
AIRCRAFT: Douglas DC-8  
AMK PROTECTION: No  
BRIEF: In-flight fire occurred during climb to cruise when No. 1 engine fuel manifold cracked. Precautionary landing was made with engine still on fire. No AMK protection expected because fire originated in-flight as an engine fire.

DATE: 65/8/16  
LOCATION: Chicago (Lake Michigan), Illinois  
OPERATOR: United Airlines  
AIRCRAFT: Boeing B-727  
AMK PROTECTION: No  
BRIEF: Accident occurred during descent when aircraft did not level off at 6,000 feet and continued descent into lake (undetermined cause). Fire occurred on impact and the aircraft was destroyed. No AMK protection expected due to the impact being nonsurvivable.

DATE: 65/10/14  
LOCATION: Wright Patterson Air Force Base, Ohio  
OPERATOR: Zantop Air Transport  
AIRCRAFT: Argosy AW-650  
AMK PROTECTION: No  
BRIEF: Accident occurred as a result of fuel exhaustion in-flight during descent. Aircraft collided with supporting pylons of a highway overpass and an automobile after landing, and a fire developed after impact. No AMK protection expected due to the aircraft being forced to land with no fuel.

DATE: 65/11/8  
LOCATION: Constance, Kentucky  
OPERATOR: American Airlines  
AIRCRAFT: Boeing B-727  
AMK PROTECTION: Probable  
BRIEF: Accident occurred as a result of pilots not monitoring altimeters during a visual approach into deteriorating visibility conditions. Aircraft crashed into a wooded hillside and burned. Probable AMK protection since the fuel release and ignition probably occurred between 125 and 147 knots, there were no known major ignition sources at fuel release locations, and the accident was impact-survivable. There is a possibility that the fire started after the aircraft came to rest, in which case AMK may have burned like Jet A.

DATE: 65/11/11  
LOCATION: Salt Lake City, Utah  
OPERATOR: United Airlines  
AIRCRAFT: Boeing B-727  
AMK PROTECTION: Probable  
BRIEF: Accident occurred as a result of the pilot failing to take timely action to arrest an excessive descent rate during the landing approach. Impact occurred short of runway and the aircraft caught fire. Probable AMK protection since the fuel release and ignition occurred at less than 120 knots, there were no major ignition sources at fuel release locations, and the accident was impact-survivable. There is a possibility that the fire started after the aircraft came to rest.

DATE: 66/4/22  
LOCATION: Ardmore, Oklahoma  
OPERATOR: American Flyers Airline  
AIRCRAFT: Lockheed L-188  
AMK PROTECTION: Probable  
BRIEF: Accident occurred as a result of the incapacitation of the pilot at a critical point during a visual approach under instrument flight conditions. The aircraft struck a hill and was destroyed by impact and fire. Probable AMK protection since the fuel release and ignition occurred between 135 and 150 knots, there were no known major ignition sources at fuel release locations, and the accident was impact-survivable.

DATE: 67/3/9  
LOCATION: Near Urbana, Ohio  
OPERATOR: Trans World Airlines  
AIRCRAFT: Douglas DC-9  
AMK PROTECTION: No  
BRIEF: In-flight collision due to failure of DC-9 crew to see and avoid another aircraft. Fire occurred after aircraft crashed and exploded. No AMK protection expected due to the impact being nonsurvivable.

DATE: 67/3/30  
LOCATION: Kenner, Louisiana  
OPERATOR: Delta Airlines  
AIRCRAFT: Douglas DC-8

AMK PROTECTION: Improbable  
BRIEF: Accident occurred during a simulated 2-engine out landing approach as a result of loss of control and improper use of flight and power controls. The aircraft struck a motel and dwellings 60° nose down and was destroyed by the impact and fire. Improbable AMK protection due to an estimated 18-degree yaw angle at fuel release and the impact being considered nonsurvivable. There is a possibility that the fire started after the aircraft came to rest.

DATE: 67/7/19  
LOCATION: Near Hendersonville, North Carolina  
OPERATOR: Piedmont Airlines  
AIRCRAFT: Boeing B-727  
AMK PROTECTION: No  
BRIEF: In-flight collision due to other aircraft deviating from IFR clearance into flight path of B-727. The aircraft was destroyed by collision forces, ground impact, and ensuing fire. No AMK protection expected due to the impact being nonsurvivable.

DATE: 67/11/6  
LOCATION: Erlanger, Kentucky  
OPERATOR: Trans World Airlines  
AIRCRAFT: Boeing B-707  
AMK PROTECTION: Yes  
BRIEF: Accident occurred during a rejected takeoff at 120 knots, when the aircraft ran off the end of the runway. The aircraft was substantially damaged by the ground slide and subsequent fire. AMK protection expected since fuel release occurred at less than 61 knots, there were no major ignition sources at fuel release locations, and the accident was impact-survivable.

DATE: 67/11/20  
LOCATION: Constance, Kentucky  
OPERATOR: Trans World Airlines  
AIRCRAFT: Convair CV-880  
AMK PROTECTION: Probable  
BRIEF: Accident occurred during final approach when crew attempted night, visual, no-glide-slope approach in deteriorating weather and landed short of the runway. The aircraft was destroyed by impacts with trees and ground and subsequent fire. Probable AMK protection since fuel was released at less than 108 knots, fire started at less than 30 knots or after aircraft came to rest, there were no known major ignition sources at fuel release locations, and the accident was impact-survivable.

DATE: 68/3/21  
LOCATION: Chicago, Illinois  
OPERATOR: United Airlines  
AIRCRAFT: Boeng B-727  
AMK PROTECTION: Yes  
BRIEF: Accident occurred during an aborted takeoff after liftoff due to improper flap setting and the resulting failure of the aircraft to climb. The aircraft landed to the right of the runway, struck a drainage ditch, and was destroyed by impact with the drainage ditch and the ensuing ground fire. AMK protection expected since the fuel release and ignition occurred between 50 and 60 knots, there were no major ignition sources at fuel release locations, and the accident was impact-survivable.



DATE: 68/8/10  
LOCATION: Charleston, West Virginia  
OPERATOR: Piedmont Airlines  
AIRCRAFT: Fairchild Hiller FH-227  
AMK PROTECTION: Improbable  
BRIEF: Accident occurred during an ILS localizer (no glide slope) approach into shallow, dense fog. The aircraft crashed into a steep hillside short of the runway and was destroyed by ground impact and subsequent fire. Improbable AMK protection since the accident was not considered to be impact-survivable.

DATE: 68/10/25  
LOCATION: Near Hanover, New Hampshire  
OPERATOR: Northeast Airlines  
AIRCRAFT: Fairchild Hiller FH-227  
AMK PROTECTION: Yes  
BRIEF: Accident occurred as a result of a premature initiation of a descent during a nonstandard instrument approach. The aircraft crashed on the side of a heavily wooded mountain and was destroyed by impact and post-impact fire. AMK protection expected since fuel release and ignition occurred at less than 120 knots, there were no known major ignition sources at fuel release locations, and the accident was impact-survivable.

DATE: 68/12/24  
LOCATION: Bradford, Pennsylvania  
OPERATOR: Allegheny Airlines  
AIRCRAFT: Convair CV-580  
AMK PROTECTION: Yes  
BRIEF: Accident occurred during an instrument approach when the aircraft descended through the minimum descent altitude in snow showers and the crew was attempting to establish visual reference to the ground. The aircraft struck a tree, rolled to an inverted position before striking the ground, and was destroyed by ground-impact forces. AMK protection expected, even though the aircraft struck the ground inverted, since all the established criteria were met for this classification, fuel release and ignition occurred at approximately 130 knots, there were no major ignition sources at fuel release locations, and the accident was impact-survivable.

DATE: 68/12/26  
LOCATION: Anchorage, Alaska  
OPERATOR: Pan American World Airways  
AIRCRAFT: Boeing B-707  
AMK PROTECTION: Improbable  
BRIEF: Accident occurred when the takeoff was made without flaps. The aircraft rolled to 90-degree right bank shortly after becoming airborne, and the right wingtip contacted the ground. The aircraft became inverted after the first contact and was destroyed by ground impact and the ensuing ground fire. AMK protection improbable since the accident was not considered to be impact-survivable.

DATE: 68/12/27  
LOCATION: Chicago, Illinois  
OPERATOR: North Central Airlines  
AIRCRAFT: Convair CV-580  
AMK PROTECTION: Probable  
BRIEF: The accident occurred during an attempted go-around following an instrument approach when the pilot became disoriented as a result of atmospheric reflection of either approach lights or landing lights. The aircraft struck a hangar in a near-inverted attitude and was destroyed by impact and resultant ground fire. AMK protection probable since fuel release occurred at less than 80 knots, there were no known major ignition sources at fuel release locations, and the accident was impact-survivable.

DATE: 69/1/6  
LOCATION: Near Bradford, Pennsylvania  
OPERATOR: Allegheny Airlines  
AIRCRAFT: Convair CV-440 (Prop Jet)  
AMK PROTECTION: Yes  
BRIEF: The accident occurred on initial approach while the flight was making an instrument landing. The aircraft descended too low (undetermined cause) and cut a swath through trees. The aircraft came to rest inverted and was destroyed by impact with trees and the ground. AMK protection expected since fuel release occurred between 100 and 130 knots, there were no known major ignition sources at fuel release locations, and the accident was impact-survivable.

DATE: 69/6/24  
LOCATION: Moses Lake, Washington  
OPERATOR: Japan Airlines  
AIRCRAFT: Convair CV-880  
AMK PROTECTION: Yes  
BRIEF: The accident occurred during a simulated critical-engine-out take-off maneuver when the aircraft yawed to the right and the right wing and No. 4 engine contacted the runway. The aircraft was demolished by impact, by disintegration as it slid through rough, rocky terrain, and by the ensuing ground fire. AMK protection expected since fuel release occurred at less than 50 knots, there were no known major ignition sources at fuel release locations, and the accident was impact-survivable.

DATE: 69/7/26  
LOCATION: Pomona, New Jersey  
OPERATOR: Trans World Airlines  
AIRCRAFT: Boeing B-707  
AMK PROTECTION: No  
BRIEF: The accident occurred during a simulated engine-out missed approach when a hydraulic system failure without restoration of power on No. 4 engine resulted in the loss of directional control. The aircraft went into a steep, descending right turn, and was destroyed by ground impact and ensuing ground fire. AMK protection not expected since there probably was a major ignition source at a fuel release location, and the accident was not considered to be impact-survivable.

DATE: 69/10/16  
LOCATION: Stockton, California  
OPERATOR: Seaboard World Airlines  
AIRCRAFT: Douglas DC-8  
AMK PROTECTION: Yes  
BRIEF: The accident occurred during a touch-and-go landing when the crew rejected the takeoff and was not able to stop on the remaining runway. The aircraft struck ditches and a roadway and was destroyed by fire. AMK protection expected since fuel release occurred at 20 knots, there were no major ignition sources at the fuel release locations, and the accident was impact-survivable.

DATE: 69/11/19  
LOCATION: Near Glens Falls, New York  
OPERATOR: Mohawk Airlines  
AIRCRAFT: Fairchild Hiller FH-227  
AMK PROTECTION: No  
BRIEF: Accident occurred during approach when the crew exceeded clearance limits and flew the aircraft into a severe "lee of a mountain downdraft" at an altitude insufficient for recovery. The aircraft contacted trees, impacted the side of a mountain, and was destroyed by impact and the ensuing fire. AMK protection not expected since the accident was not impact-survivable.

DATE: 70/9/8  
LOCATION: Jamaica, New York  
OPERATOR: Trans World Airlines  
AIRCRAFT: Douglas DC-8  
AMK PROTECTION: No  
BRIEF: The accident occurred after the aircraft became airborne on takeoff when the pitch control was lost due to a stone lodged in the right elevator. The aircraft impacted the ground with a 90-degree angle-of-bank and was destroyed by impact and post-impact fire. AMK protection not expected since the accident was not impact-survivable.

DATE: 70/11/14  
LOCATION: Huntington, West Virginia  
OPERATOR: Southern Airways  
AIRCRAFT: Douglas DC-9  
AMK PROTECTION: No  
BRIEF: The accident occurred when the aircraft descended below minimum descent altitude (reason undetermined) during a nonprecision approach under adverse operating conditions. The aircraft impacted trees on a hill and was destroyed by impact and ground fire. AMK protection not expected since the accident was not considered impact-survivable.

DATE: 70/11/27  
LOCATION: Anchorage, Alaska  
OPERATOR: Capitol International Airways  
AIRCRAFT: Douglas DC-8  
AMK PROTECTION: Yes  
BRIEF: The accident occurred when the aircraft failed to attain the necessary airspeed for lift-off during an attempted takeoff, as a result of all main landing gear brakes being locked (reason undetermined). The aircraft overran the end of the runway, struck a wooden barrier, an ILS structure, and a drainage ditch,

and was destroyed by fire. AMK protection expected since the fuel release occurred at approximately 100 knots, there was no known major ignition source at fuel release locations, and the accident was impact-survivable.

DATE: 70/12/28  
LOCATION: St. Thomas, Virgin Islands  
OPERATOR: Trans Caribbean Airways  
AIRCRAFT: Boeing B-727  
AMK PROTECTION: Improbable  
BRIEF: The accident occurred when the crew used improper techniques in recovering from a high bounce generated by a poorly executed approach and touchdown. The right wingtip contacted the runway and the aircraft veered off the runway, passed through a fence, crossed a highway, and came to rest against a hillside. The aircraft was destroyed by fire. AMK protection improbable since ignition probably occurred as the aircraft came to rest, there were no major ignition sources at fuel release locations, and the accident was impact-survivable.

DATE: 71/3/31  
LOCATION: Ontario, CA  
OPERATOR: Western Airlines  
AIRCRAFT: Boeng B-720  
AMK PROTECTION: No  
BRIEF: The accident occurred during a simulated engine-out missed approach when the aircraft rotated to the right and the nose descended to a near-vertical downward position. Complete loss of left rudder control resulted when a rudder hydraulic actuator fitting failed. The aircraft was destroyed by the impact forces and ensuing fire. AMK protection not expected since the accident was not impact-survivable.

DATE: 71/6/6  
LOCATION: Near Duarte, California  
OPERATOR: Hughes Air West  
AIRCRAFT: Douglas, DC-9  
AMK PROTECTION: No  
BRIEF: The accident occurred when the DC-9 collided with a military aircraft while climbing through 15,000 feet. The DC-9 crashed into a canyon with approximately 60-degree slopes and was destroyed by ground impact and subsequent fire. No AMK protection expected since accident was not impact-survivable.

DATE: 71/6/7  
LOCATION: New Haven, Connecticut  
OPERATOR: Allegheny Airlines  
AIRCRAFT: Convair CV-580  
AMK PROTECTION: Yes  
BRIEF: The accident occurred when the aircraft descended below the prescribed minimum descent altitude during a nonprecision instrument approach under adverse weather conditions. The aircraft struck three beach cottages and was destroyed by the fire that developed upon initial impact. AMK protection expected since fuel release occurred at approximately 100 knots, there were no known major ignition sources at fuel release locations, and the accident was impact-survivable.

DATE: 71/9/4  
LOCATION: Near Juneau, Alaska  
OPERATOR: Alaska Airlines  
AIRCRAFT: Boeing B-727  
AMK PROTECTION: No  
BRIEF: The accident occurred during an instrument approach when the aircraft struck a mountain slope as a result of a premature descent below obstacle clearance altitude (cause undetermined). The aircraft was destroyed by impact and isolated postcrash fires. No AMK protection expected since the fuel release and ignition occurred at 200 knots and the accident was not impact-survivable.

DATE: 72/5/18  
LOCATION: Ft. Lauderdale, Florida  
OPERATOR: Eastern Airlines  
AIRCRAFT: Douglas DC-9  
AMK PROTECTION: Yes  
BRIEF: The accident occurred when the aircraft touched down hard, the main landing gear failed, and the tail section separated during an instrument approach under adverse weather conditions. The aircraft was severely damaged by impact and destroyed in the postcrash fire. AMK protection expected since the fuel release occurred at 140 knots, there were no major ignition sources at the fuel release locations, and the accident was impact-survivable.

DATE: 72/5/30  
LOCATION: Fort Worth, Texas  
OPERATOR: Delta Airlines  
AIRCRAFT: Douglas DC-9  
AMK PROTECTION: Yes  
BRIEF: The accident occurred while attempting a go-around following a landing approach, when the aircraft encountered a trailing vortex generated by a preceding DC-10. The DC-9 rolled rapidly to the right and struck the runway in an extreme right wing low attitude. The aircraft was destroyed by the impact forces and the subsequent fire. AMK protection expected since the fuel release occurred at 140 knots, there were no known major ignition sources at fuel release locations, and the accident was considered impact-survivable.

DATE: 72/6/29  
LOCATION: Near Appleton, Wisconsin  
OPERATOR: North Central Airlines  
AIRCRAFT: Convair CV-580  
AMK PROTECTION: No  
BRIEF: The accident occurred when the CV-580 collided with another aircraft at 2,500 feet altitude while on an approach under visual flight rules. An explosion and fire followed the in-flight collision and the CV-580 fell into a lake and was destroyed. AMK protection not expected since the accident was not impact-survivable.

DATE: 72/6/29  
LOCATION: Near Appleton, Wisconsin  
OPERATOR: Air Wisconsin  
AIRCRAFT: Dehavilland DHC-6  
AMK PROTECTION: No  
BRIEF: The accident occurred when the DHC-6 collided with another aircraft at 2,500 feet altitude while on an approach under visual flight rules. An

explosion and fire followed the in-flight collision and the DHC-6 fell into a lake and was destroyed. AMK protection not expected since the accident was not impact-survivable.

DATE: 72/8/13  
LOCATION: Jamaica, New York  
OPERATOR: Jugoslovenski Aerotransport  
AIRCRAFT: Boeing B-707  
AMK PROTECTION: Yes  
BRIEF: The accident occurred during a rejected takeoff, when the right cockpit sliding window came open, and the aircraft ran off the end of the runway and struck a blast fence. The left engine cowls and the left wing received major damage on impacting the blast fence and from the subsequent fire. AMK protection expected since the fuel release occurred at less than 20 knots, there were no major ignition sources at fuel release locations, and the accident was impact-survivable.

DATE: 72/12/8  
LOCATION: Chicago, Illinois  
OPERATOR: United Airlines  
AIRCRAFT: Boeing B-737  
AMK PROTECTION: Probable  
BRIEF: The accident occurred when the crew failed to exercise positive flight management during the execution of a nonprecision approach and the aircraft stalled. The aircraft impacted into a residential area 1.5 miles short of the runway and was destroyed by the impact and subsequent fire. Probable AMK protection since the fuel release occurred at less than 100 knots, there were no known major ignition sources at the fuel release locations, and the accident was impact-survivable. There is a possibility that the fire started after the aircraft came to rest.

DATE: 72/12/20  
LOCATION: Chicago, Illinois  
OPERATOR: North Central Airlines  
AIRCRAFT: Douglas DC-9  
AMK PROTECTION: Yes  
BRIEF: The accident occurred when the DC-9 was taking off in restricted visibility and collided with another aircraft which was taxiing across the runway. An attempt to clear the other aircraft by gaining altitude was unsuccessful and the crew flew the aircraft back onto the runway and the nose and left main landing gear failed. The aircraft was destroyed by impact and fire. AMK protection expected since the fuel release occurred between 125 and 140 knots, there were no known major sources at fuel release locations, and the accident was impact-survivable.

DATE: 72/12/29  
LOCATION: Miami (Everglades), Florida  
OPERATOR: Eastern Airlines  
AIRCRAFT: Lockheed L-1011  
AMK PROTECTION: Probable  
BRIEF: The accident occurred when the crew was preoccupied with a malfunction of the nose landing gear position indicating system and failed to detect an unexpected descent. The aircraft crashed into the Everglades and was destroyed. AMK protection probable since the fuel release probably occurred between 125 and 150 knots, there were no known major ignition sources at fuel release locations, and the accident was impact-survivable.

DATE: 73/3/5  
LOCATION: Denver, Colorado  
OPERATOR: American Airlines  
AIRCRAFT: Boeing B-707  
AMK PROTECTION: No  
BRIEF: The accident occurred during an attempted takeoff on a 3-engine ferry flight. A premature rotation caused the aircraft to stall and impact the runway. The aircraft received substantial damage during the impact and slideout. No AMK protection expected since the ignition source was at the fuel release location.

DATE: 73/6/23  
LOCATION: Jamaica, New York  
OPERATOR: Loftleidir Icelandic Airlines  
AIRCRAFT: Douglas DC-8  
AMK PROTECTION: Yes  
BRIEF: The accident occurred when the ground spoilers were inadvertently deployed just before touchdown and the aircraft struck short of the runway, tail first, at a high rate of descent. The aircraft was damaged substantially on impact. AMK protection expected since fuel release occurred at approximately 110 knots, there were no major ignition sources at fuel release locations, and the accident was impact-survivable.

DATE: 73/7/23  
LOCATION: St. Louis, Missouri  
OPERATOR: Ozark Airlines  
AIRCRAFT: Fairchild Hiller FH-227  
AMK PROTECTION: No  
BRIEF: The accident occurred when the aircraft encountered a downdraft during an instrument approach in a thunderstorm. The aircraft was destroyed. AMK protection not expected since the accident was not impact-survivable.

DATE: 73/7/31  
LOCATION: Boston, Massachusetts  
OPERATOR: Delta Airlines  
AIRCRAFT: Douglas DC-9  
AMK PROTECTION: No  
BRIEF: The accident occurred when the aircraft descended through the approach decision height during an ILS approach and crashed into a seawall about 3,000 feet short of the runway displacement threshold. The aircraft was destroyed. AMK protection not expected since the accident was not considered to be impact-survivable.

DATE: 73/9/8  
LOCATION: Near King Cover, Alaska  
OPERATOR: World Airways  
AIRCRAFT: Douglas DC-8  
AMK PROTECTION: No  
BRIEF: The accident occurred when the crew deviated from approved instrument approach procedures and descended into mountain terrain. The aircraft crashed into a mountain at the 3500-foot level and was destroyed by impact and fire. AMK protection not expected since the accident was not impact-survivable.

DATE: 73/9/27  
LOCATION: Near Mean, Arkansas  
OPERATOR: Texas International Airlines  
AIRCRAFT: Convair CV-600  
AMK PROTECTION: No  
BRIEF: The accident occurred when the crew attempted to operate the flight under visual flight rules in night instrument meteorological conditions and deviated from the pre-planned route, and the aircraft crashed into a mountain slope at the 2,000-foot level. AMK protection not expected since the accident was not impact-survivable.

DATE: 73/11/3  
LOCATION: Boston, Massachusetts  
OPERATOR: Pan American World Airways  
AIRCRAFT: Boeing B-707  
AMK PROTECTION: Improbable  
BRIEF: The accident occurred when smoke built up in the cockpit to the point that the control of the aircraft was lost during final approach. The aircraft crashed short of the runway and was destroyed. AMK protection improbable since the accident was not considered impact-survivable.

DATE: 73/11/27  
LOCATION: Chattanooga, Tennessee  
OPERATOR: Delta Airlines  
AIRCRAFT: Douglas DC-9  
AMK PROTECTION: Yes  
BRIEF: The accident occurred during an ILS approach when the crew did not recognize the need to correct an excessive rate of descent due to wind-shear. The aircraft struck the approach lights and a flood-control dike and was destroyed. AMK protection expected since the fuel release occurred at approximately 110 knots, there were no major ignition sources at fuel release locations, and the accident was impact-survivable.

DATE: 73/12/17  
LOCATION: Boston, Massachusetts  
OPERATOR: Iberian Airlines  
AIRCRAFT: Douglas DC-10  
AMK PROTECTION: Probable  
BRIEF: The accident occurred during an ILS approach when the crew did not recognize an increased rate of descent due to wind-shear. The aircraft struck approach light piers and an embankment and was substantially damaged. AMK protection probable since the fuel release occurred between 70 and 100 knots, the fuel ignited less than 110 knots, there probably was a limited ignition source at the fuel release location, and the accident was impact-survivable.

DATE: 74/1/16  
LOCATION: Los Angeles, California  
OPERATOR: Trans World Airlines  
AIRCRAFT: Boeing B-707  
AMK PROTECTION: No  
BRIEF: The accident occurred during a night visual approach when the crew lost outside visual reference because of fog and the nose landing gear collapsed upon touchdown. The aircraft fuselage was destroyed by a postcrash fire. AMK



protection not expected since a hydraulic fluid fire started in the electronic bay beneath the flight deck and developed into a cabin fire, without producing a fuel fire.

DATE: 74/1/30  
LOCATION: Pago Pago, Samoa  
OPERATOR: Pan American World Airways  
AIRCRAFT: Boeing B-707  
AMK PROTECTION: Probable  
BRIEF: The accident occurred during a night ILS approach when the crew failed to correct an excessive rate of descent after the aircraft passed the decision height. The aircraft contacted trees and a lava rock wall and came to rest 3,900 feet short of the runway. The aircraft was destroyed by impact and fire. AMK protection probable since the fuel was released at less than 140 knots, there were no known major ignition sources at the fuel release locations, and the accident was impact-survivable.

DATE: 74/2/7  
LOCATION: Los Angeles, California  
OPERATOR: Foreign Flag Carrier  
AIRCRAFT: Douglas DC-8  
AMK PROTECTION: No  
BRIEF: The accident occurred during an aborted takeoff when a tire blew and the aircraft was unable to stop due to a worn brake. The aircraft was substantially damaged. AMK protection not expected since the fire was limited to the wheel well area.

DATE: 74/5/23  
LOCATION: Springfield, Illinois  
OPERATOR: Saturn Airways  
AIRCRAFT: Lockheed L-382  
AMK PROTECTION: No  
BRIEF: The accident occurred when the outboard section of the left wing separated in-flight and the aircraft was destroyed as a result of the in-flight breakup and ground impact. AMK protection not expected since the accident was not impact-survivable.

DATE: 74/9/11  
LOCATION: Charlotte, North Carolina  
OPERATOR: Eastern Airlines  
AIRCRAFT: Douglas DC-9  
AMK PROTECTION: Yes  
BRIEF: The accident occurred during a VOR DME nonprecision approach in fog when the aircraft struck trees and impacted the ground 3.3 miles short of the runway. The aircraft was destroyed by impact and fire. AMK protection expected since the fuel release occurred at 70 knots, there were no known ignition sources at the fuel release locations, and the accident was impact-survivable.

DATE: 74/12/1  
LOCATION: Berryville, Virgin Islands  
OPERATOR: Trans World Airlines  
AIRCRAFT: Boeing B-727  
AMK PROTECTION: No

BRIEF: The accident occurred while the aircraft was descending for a VOR/DME approach and descended to 1,800 feet prematurely. The aircraft flew into a mountain slope and was destroyed. AMK protection not expected since the accident was not impact-survivable.

DATE: 75/6/24  
LOCATION: Jamaica, New York  
OPERATOR: Eastern Airlines  
AIRCRAFT: Boeing B-727  
AMK PROTECTION: Yes

BRIEF: The accident occurred during an ILS approach through a thunderstorm when a high descent rate was encountered due to adverse winds. The aircraft struck approach light towers, the outboard section of the left wing was severed, and the aircraft was destroyed by impact and fire. AMK protection expected since the fuel release occurred at approximately 125 knots, there were no known ignition sources at the fuel release locations, and the accident was impact-survivable.

DATE: 75/8/30  
LOCATION: Gambel, Alaska  
OPERATOR: Wien Air Alaska  
AIRCRAFT: Fairchild F-27  
AMK PROTECTION: Yes

BRIEF: The accident occurred while attempting to land in adverse weather conditions when the aircraft crashed into a mountain slope. The aircraft was destroyed by impact and fire. AMK protection expected since the fuel release occurred at less than 70 knots, there were no known major ignition sources at the fuel release locations, and the accident was impact-survivable.

DATE: 75/9/27  
LOCATION: Miami, Florida  
OPERATOR: AeroTransportes Entre Rios  
AIRCRAFT: Canadair CL-44  
AMK PROTECTION: Probable

BRIEF: The accident occurred during an attempted takeoff with a flight control lock on the right elevator. The aircraft did not become airborne and the crew attempted unsuccessfully to reject the takeoff. The aircraft ran off the departure end of the runway, crashed into a canal, and was destroyed. AMK protection probable since the fire may have started as the aircraft came to rest, there were no known major ignition sources at fuel release locations, and the accident was impact-survivable.

DATE: 75/11/12  
LOCATION: Jamaica, New York  
OPERATOR: Overseas National Airways  
AIRCRAFT: Douglas DC-10  
AMK PROTECTION: Improbable

BRIEF: The accident occurred during an attempted takeoff when the aircraft struck a large number of birds, the No. 3 engine disintegrated, and the takeoff was rejected. The No. 3 engine caught fire and the landing gear collapsed when the aircraft departed the runway. AMK protection improbable since fuel was released at the No. 3 engine at 168 knots and from a ruptured wing at less than 40 knots, and there was a major ignition source at fuel release locations. The accident was impact-survivable.

DATE: 76/4/5  
LOCATION: Ketchikan, Alaska  
OPERATOR: Alaska Airlines  
AIRCRAFT: Boeing B-727  
AMK PROTECTION: Yes  
BRIEF: The accident occurred when the crew abandoned a precision approach under conditions of low ceiling and low visibility, touched down long on a wet runway at an excessive speed, and overran the end of the runway after initiating a go-around. The aircraft crashed in a ravine about 700 feet past the runway threshold and was destroyed by impact and ground fire. AMK protection expected since the fuel release occurred at less than 100 knots, there were no known major ignition sources at the fuel release locations, and the accident was impact-survivable.

DATE: 76/4/27  
LOCATION: St. Thomas, Virgin Islands  
OPERATOR: American Airlines  
AIRCRAFT: Boeing B-727  
AMK PROTECTION: Yes  
BRIEF: The accident occurred when the crew initiated a go-around maneuver with insufficient runway remaining after a long touchdown. The aircraft struck an antenna, crashed through a fence, struck a building, and was destroyed. AMK protection expected since the fuel release occurred at approximately 100 knots, and the accident was impact-survivable.

DATE: 76/11/16  
LOCATION: Denver, Colorado  
OPERATOR: Texas International Airlines  
AIRCRAFT: Douglas DC-9  
AMK PROTECTION: Yes  
BRIEF: The accident occurred during a rejected takeoff due to a false stall warning after the aircraft had rotated. The aircraft overran the runway, traversed drainage ditches, struck approach light stanchions, and was damaged severely by impact and fire. The fuel release occurred at approximately 100 knots, there were no major ignition sources at the fuel release locations, and the accident was impact-survivable.

DATE: 77/4/4  
LOCATION: New Hope, Georgia  
OPERATOR: Southern Airways  
AIRCRAFT: Douglas DC-9  
AMK PROTECTION: Probable  
BRIEF: The accident occurred when the flight entered a severe thunderstorm, lost both engines, and was forced to make an emergency landing on a highway. The aircraft struck trees, utility poles, gasoline pumps, five automobiles, and a truck along the highway. The aircraft was destroyed. AMK protection probable since the fuel release probably occurred at less than 155 knots, there were no major ignition sources at the fuel release locations, and the accident was impact-survivable.

DATE: 78/3/1  
LOCATION: Los Angeles, California  
OPERATOR: Continental Airlines  
AIRCRAFT: Douglas DC-10  
AMK PROTECTION: Improbable

APPENDIX B

ACCIDENT CROSS REFERENCE

BY DATE, LOCATION, AIRLINE, AND AIRCRAFT

# Accidents by Date

DATE	LOCATION	AIRLINE	AIRCRAFT
07-May-64	California, San Ramon	Pacific Air Lines	F-27, Fairchild
15-Nov-64	Nevada, Las Vegas	Bonanza Air Lines	F-27, Fairchild
09-Jun-65	California, San Francisco	National Airlines	DC-8, Douglas
14-Aug-65	Illinois, Chicago (Lake Michigan)	United Airlines	B-727, Boeing
14-Oct-65	Ohio, Wright-Patterson AFB	Zantop Air Transport	AW-650, Argosy
08-Nov-65	Kentucky, Constance	American Airlines	B-727, Boeing
11-Nov-65	Utah, Salt Lake City	United Airlines	B-727, Boeing
22-Apr-66	Oklahoma, Ardmore	American Flyers Airline	L-188, Lockheed
01-Oct-66	Oregon, near Wemme	West Coast Airlines	DC-9, Douglas
09-Mar-67	Ohio, near Urbana	Trans World Airlines	DC-9, Douglas
30-Mar-67	Louisiana, Kenner	Delta Air Lines	DC-8, Douglas
19-Jul-67	North Carolina, Hendersonville	Piedmont Airlines	B-727, Boeing
06-Nov-67	Kentucky, Erlanger	Trans World Airlines	B-707, Boeing
20-Nov-67	Kentucky, Constance	Trans World Airlines	CV-880, Convair
21-Mar-68	Illinois, Chicago (O'Hare)	United Air Lines	B-727, Boeing
10-Aug-68	West Virginia, Charleston	Piedmont Airlines	FH-227, Fairchild
25-Oct-68	New Hampshire, near Hanover	Northeast Airlines	FH-227, Fairchild
24-Dec-68	Pennsylvania, Bradford	Allegheny Airlines	CV-580, Convair
26-Dec-68	Alaska, Anchorage	Pan American World Airways	B-707, Boeing
27-Dec-68	Illinois, Chicago (O'Hare)	North Central Airlines	CV-580, Convair
06-Jan-69	Pennsylvania, near Bradford	Pan American World Airways	CV-440, Convair
24-Jun-69	Washington, Moses Lake	Japan Air Lines	CV-880, Convair
26-Jul-69	New Jersey, Pomona	Trans World Airlines	B-707, Boeing
16-Oct-69	California, Stockton	Seaboard World Airlines	DC-8, Douglas
19-Nov-69	New York, near Glen Falls	Mohawk Airlines	FH-227, Fairchild
08-Sep-70	New York, Jamaica (JFK)	Trans International Airlines	DC-8, Douglas
14-Nov-70	West Virginia, Huntington	Southern Airways	DC-9, Douglas
27-Nov-70	Alaska, Anchorage	Capitol International Airways	DC-8, Douglas
28-Dec-70	Virgin Islands, St. Thomas	Trans Caribbean Airways	B-727, Boeing
31-Mar-71	California, Ontario	Western Air Lines	B-720, Boeing
06-Jun-71	California, near Duarte	Hughes Air West	DC-9, Douglas
07-Jun-71	Connecticut, New Haven	Allegheny Airlines	CV-580, Convair
04-Sep-71	Alaska, near Juneau	Alaska Airlines	B-727, Boeing
18-May-72	Florida, Ft. Lauderdale	Eastern Air Lines	DC-9, Douglas
30-May-72	Texas, Ft. Worth	Delta Air Lines	DC-9, Douglas
29-Jun-72	Wisconsin, near Appleton	North Central Airlines	CV-580, Convair
29-Jun-72	Wisconsin, near Appleton	Air Wisconsin	DHC6, DeHavilland
13-Aug-72	New York, Jamaica (JFK)	Jugoslovenski Aerotransport	B-707, Boeing
08-Dec-72	Illinois, Chicago (Midway)	United Airlines	B-737, Boeing
20-Dec-72	Illinois, Chicago (O'Hare)	North Central Airlines	DC-9, Douglas
29-Dec-72	Florida, Miami	Eastern Airlines	L-1011, Lockheed
05-Mar-73	Colorado, Denver	American Airlines	B-707, Boeing
23-Jun-73	New York, Jamaica (JFK)	Loftleidir Icelandic Airways	DC-8, Douglas
23-Jul-73	Missouri, St. Louis	Ozark Air Lines	FH-227, Fairchild
31-Jul-73	Massachusetts, Boston	Delta Air Lines	DC-9, Douglas
08-Sep-73	Alaska, King Cove	World Airways	DC-8, Douglas
27-Sep-73	Arkansas, Mena	Texas International Airlines	CV-600, Convair
28-Oct-73	North Carolina, Greensboro	Piedmont Airlines	B-737, Boeing
03-Nov-73	Massachusetts, Boston	Pan American World Airways	B-707, Boeing
27-Nov-73	Tennessee, Chattanooga	Delta Air Lines	DC-9, Douglas
17-Dec-73	Massachusetts, Boston	Iberian Airlines	DC-10, Douglas
16-Jan-74	California, Los Angeles	Trans World Airlines	B-707, Boeing
30-Jan-74	American Samoa, Pago Pago	Pan American World Airways	B-707, Boeing
07-Feb-74	California, Los Angeles	Other, Foreign Flag Carrier	DC-8, Douglas
23-May-74	Illinois, Springfield	Saturn Airways	L-382, Lockheed

# Accidents by Date

DATE	LOCATION	AIRLINE	AIRCRAFT
11-Sep-74	North Carolina, Charlotte	Eastern Airlines	DC-9, Douglas
01-Dec-74	Virginia, Berryville	Trans World Airlines	B-727, Boeing
30-Apr-75	Alaska, Deadhorse	Zantop International Airlines	L-188, Lockheed
24-Jun-75	New York, Jamaica (JFK)	Eastern Airlines	B-727, Boeing
30-Aug-75	Alaska, Gambel	Wien Air Alaska	F-27, Fairchild
27-Sep-75	Florida, Miami	Aerotransportes Entre Rios	CL-44, Canadair
12-Nov-75	New York, Jamaica (JFK)	Overseas National Airways	DC-10, Douglas
05-Apr-76	Alaska, Ketchikan	Alaska Airlines	B-727, Boeing
27-Apr-76	Virgin Islands, St. Thomas	American Airlines	B-727, Boeing
16-Nov-76	Colorado, Denver	Texas International Airlines	DC-9, Douglas
04-Apr-77	Georgia, New Hope	Southern Airways	DC-9, Douglas
01-Mar-78	California, Los Angeles	Continental Airlines	DC-10, Douglas
25-Sep-78	California, San Diego	Pacific Southwest	B-727, Boeing
25-May-79	Illinois, Chicago	American Airlines	DC-10, Douglas
21-Nov-80	West Caroline Island, YAP	Continental Airlines	B-727, Boeing
29-Dec-80	Arizona, Phoenix	United Airlines	DC-8, Douglas
17-Feb-81	California, Santa Ana	Air California	B-737, Boeing

# Accidents by Aircraft Type

DATE	LOCATION	AIRLINE	AIRCRAFT
14-Oct-65	Ohio, Wright-Patterson AFB	Zantop Air Transport	AW-650, Argosy
06-Nov-67	Kentucky, Erlanger	Trans World Airlines	B-707, Boeing
26-Dec-68	Alaska, Anchorage	Pan American World Airways	B-707, Boeing
26-Jul-69	New Jersey, Pomona	Trans World Airlines	B-707, Boeing
13-Aug-72	New York, Jamaica (JFK)	Jugoslovenski Aerotransport	B-707, Boeing
05-Mar-73	Colorado, Denver	American Airlines	B-707, Boeing
03-Nov-73	Massachusetts, Boston	Pan American World Airways	B-707, Boeing
16-Jan-74	California, Los Angeles	Trans World Airlines	B-707, Boeing
30-Jan-74	American Samoa, Pago Pago	Pan American World Airways	B-707, Boeing
31-Mar-71	California, Ontario	Western Air Lines	B-720, Boeing
16-Aug-65	Illinois, Chicago (Lake Michigan)	United Airlines	B-727, Boeing
08-Nov-65	Kentucky, Constance	American Airlines	B-727, Boeing
11-Nov-65	Utah, Salt Lake City	United Airlines	B-727, Boeing
19-Jul-67	North Carolina, Hendersonville	Piedmont Airlines	B-727, Boeing
21-Mar-68	Illinois, Chicago (O'Hare)	United Air Lines	B-727, Boeing
28-Dec-70	Virgin Islands, St. Thomas	Trans Caribbean Airways	B-727, Boeing
04-Sep-71	Alaska, near Juneau	Alaska Airlines	B-727, Boeing
01-Dec-74	Virginia, Berryville	Trans World Airlines	B-727, Boeing
24-Jun-75	New York, Jamaica (JFK)	Eastern Airlines	B-727, Boeing
05-Apr-76	Alaska, Ketchikan	Alaska Airlines	B-727, Boeing
27-Apr-76	Virgin Islands, St. Thomas	American Airlines	B-727, Boeing
25-Sep-78	California, San Diego	Pacific Southwest	B-727, Boeing
21-Nov-80	West Caroline Island, YAP	Continental Airlines	B-727, Boeing
08-Dec-72	Illinois, Chicago (Midway)	United Airlines	B-737, Boeing
28-Oct-73	North Carolina, Greensboro	Piedmont Airlines	B-737, Boeing
17-Feb-81	California, Santa Ana	Air California	B-737, Boeing
27-Sep-75	Florida, Miami	Aerotransportes Entre Rios	CL-44, Canadair
06-Jan-69	Pennsylvania, near Bradford	Pan American World Airways	CV-440, Convair
24-Dec-68	Pennsylvania, Bradford	Allegheny Airlines	CV-580, Convair
27-Dec-68	Illinois, Chicago (O'Hare)	North Central Airlines	CV-580, Convair
07-Jun-71	Connecticut, New Haven	Allegheny Airlines	CV-580, Convair
29-Jun-72	Wisconsin, near Appleton	North Central Airlines	CV-580, Convair
27-Sep-73	Arkansas, Mena	Texas International Airlines	CV-600, Convair
20-Nov-67	Kentucky, Constance	Trans World Airlines	CV-880, Convair
24-Jun-69	Washington, Moses Lake	Japan Air Lines	CV-880, Convair
17-Dec-73	Massachusetts, Boston	Iberian Airlines	DC-10, Douglas
12-Nov-75	New York, Jamaica (JFK)	Overseas National Airways	DC-10, Douglas
01-Mar-78	California, Los Angeles	Continental Airlines	DC-10, Douglas
25-May-79	Illinois, Chicago	American Airlines	DC-10, Douglas
09-Jun-65	California, San Francisco	National Airlines	DC-8, Douglas
30-Mar-67	Louisiana, Kenner	Delta Air Lines	DC-8, Douglas
16-Oct-69	California, Stockton	Seaboard World Airlines	DC-8, Douglas
08-Sep-70	New York, Jamaica (JFK)	Trans International Airlines	DC-8, Douglas
27-Nov-70	Alaska, Anchorage	Capitol International Airways	DC-8, Douglas
23-Jun-73	New York, Jamaica (JFK)	Loftleidir Icelandic Airways	DC-8, Douglas
08-Sep-73	Alaska, King Cove	World Airways	DC-8, Douglas
07-Feb-74	California, Los Angeles	Other, Foreign Flag Carrier	DC-8, Douglas
29-Dec-80	Arizona, Phoenix	United Airlines	DC-8, Douglas
01-Oct-66	Oregon, near Wemme	West Coast Airlines	DC-9, Douglas
09-Mar-67	Ohio, near Urbana	Trans World Airlines	DC-9, Douglas
14-Nov-70	West Virginia, Huntington	Southern Airways	DC-9, Douglas
06-Jun-71	California, near Duarte	Hughes Air West	DC-9, Douglas
18-May-72	Florida, Ft. Lauderdale	Eastern Air Lines	DC-9, Douglas
30-May-72	Texas, Ft. Worth	Delta Air Lines	DC-9, Douglas
20-Dec-72	Illinois, Chicago (O'Hare)	North Central Airlines	DC-9, Douglas

# Accidents by Aircraft Type

DATE	LOCATION	AIRLINE	AIRCRAFT
31-Jul-73	Massachusetts, Boston	Delta Air Lines	DC-9, Douglas
27-Nov-73	Tennessee, Chattanooga	Delta Air Lines	DC-9, Douglas
11-Sep-74	North Carolina, Charlotte	Eastern Airlines	DC-9, Douglas
16-Nov-76	Colorado, Denver	Texas International Airlines	DC-9, Douglas
04-Apr-77	Georgia, New Hope	Southern Airways	DC-9, Douglas
29-Jun-72	Wisconsin, near Appleton	Air Wisconsin	DHC6, DeHavilland
07-May-64	California, San Ramon	Pacific Air Lines	F-27, Fairchild
15-Nov-64	Nevada, Las Vegas	Bonanza Air Lines	F-27, Fairchild
30-Aug-75	Alaska, Gambel	Wien Air Alaska	F-27, Fairchild
10-Aug-68	West Virginia, Charleston	Piedmont Airlines	FH-227, Fairchild
25-Oct-68	New Hampshire, near Hanover	Northeast Airlines	FH-227, Fairchild
19-Nov-69	New York, near Glen Falls	Mohawk Airlines	FH-227, Fairchild
23-Jul-73	Missouri, St. Louis	Ozark Air Lines	FH-227, Fairchild
29-Dec-72	Florida, Miami	Eastern Airlines	L-1011, Lockheed
22-Apr-66	Oklahoma, Ardmore	American Flyers Airline	L-188, Lockheed
30-Apr-75	Alaska, Deadhorse	Zantop International Airlines	L-188, Lockheed
23-May-74	Illinois, Springfield	Saturn Airways	L-382, Lockheed



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